Co-existence of 9.6 Tb/s Classical and Quantum Key Distribution (QKD) Channels over a 7-Core Multicore Fibre

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Motivation

- Relies on laws of physics
- Security against brute force attacks (Classical Computers)
- Field trials with QKD

QKD

- Protects vs quantum computing threats
- DV-QKD units are commercially available

Depends on exchange of weak optical pulses (photons), being vulnerable to:

Excessive optical link losses

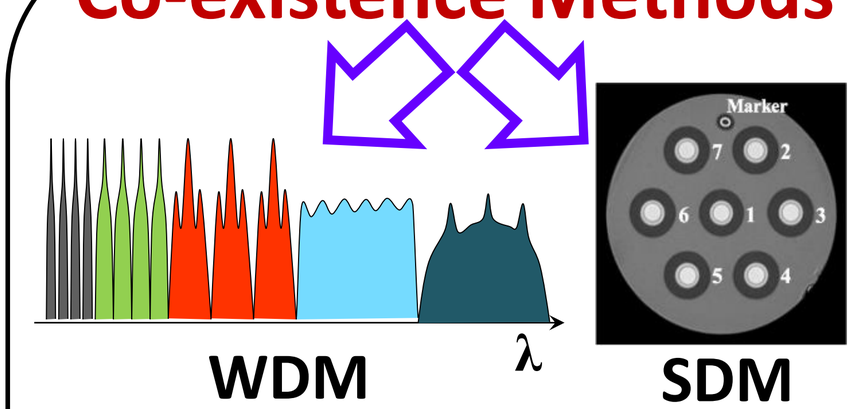
photon-induced noise in a quantum channel

ICT infrastructure will not change to accommodate Quantum network functions

Co-existence of classical (CC) / quantum channels (QC) is limited by these effects!

Record high transmission of 9.6Tb/s (CCs) and DV-QKD (QC) over a 1km long 7-core Multicore Fibre

Co-existence Methods

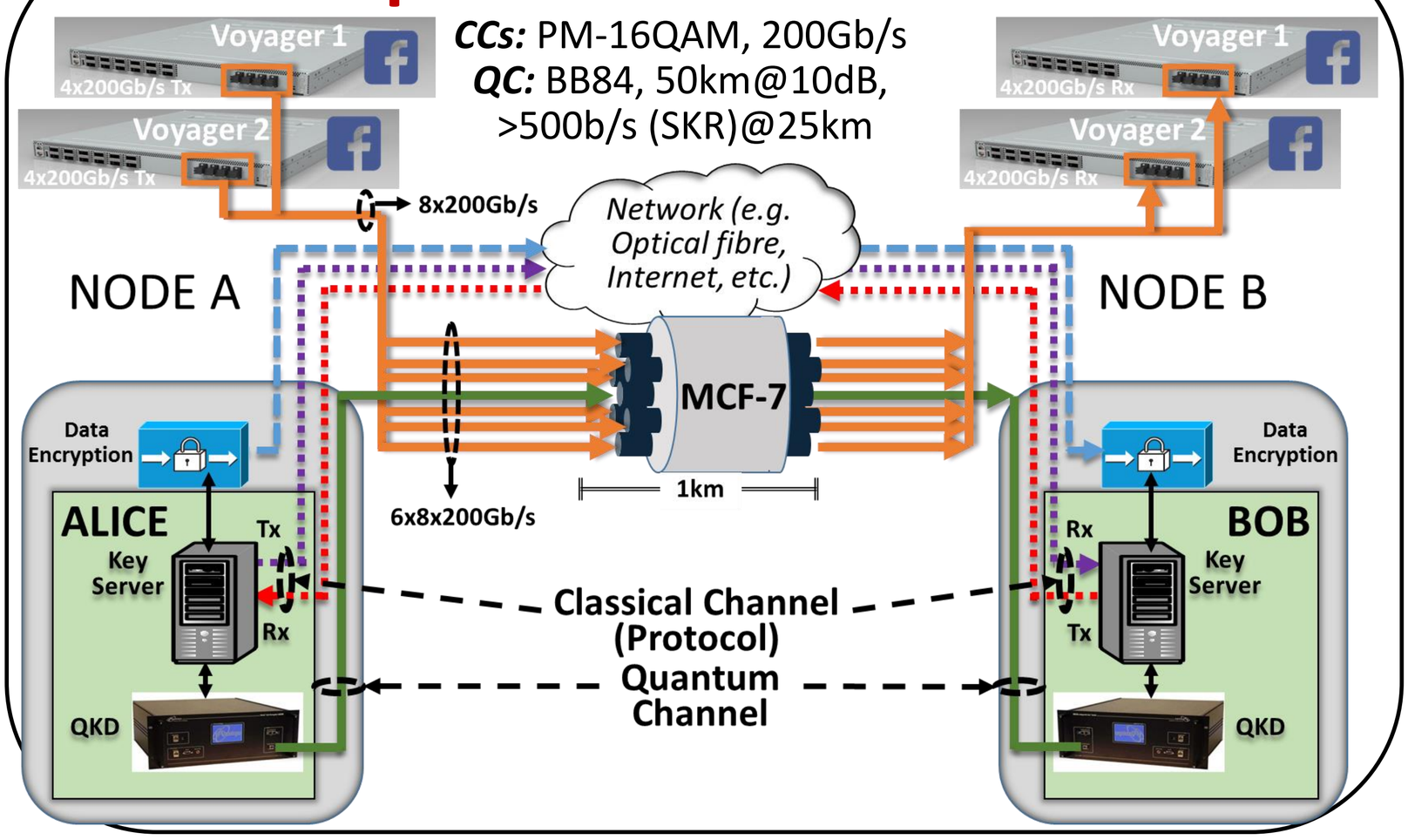


WDM **SDM**

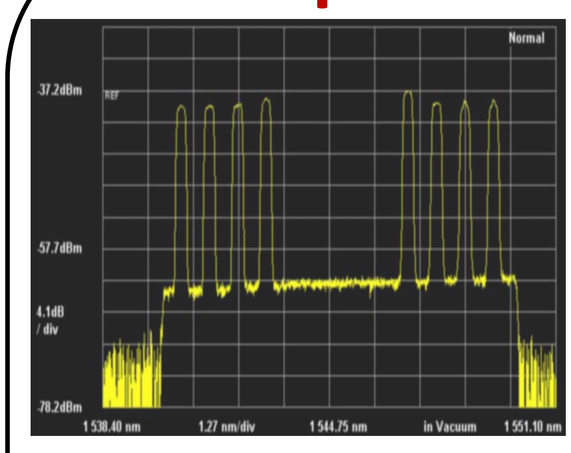
SDM with multicore fibre (MCF) offers:

- Enhanced channel isolation between cores
- Allows co-existence between QC and CCs.

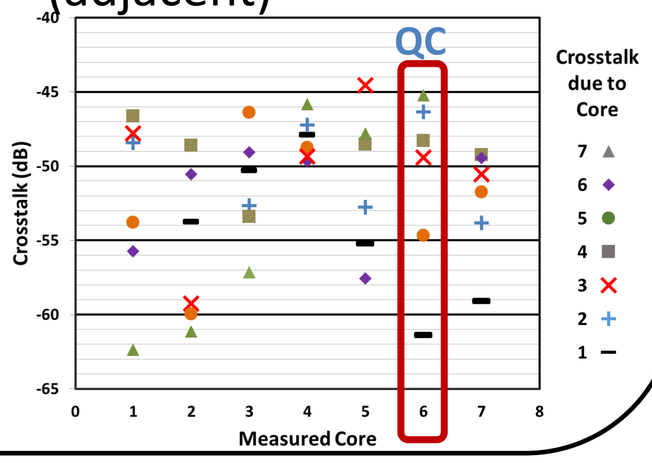
Experimental Test-bed



CCs Spectrum - MCF Crosstalk

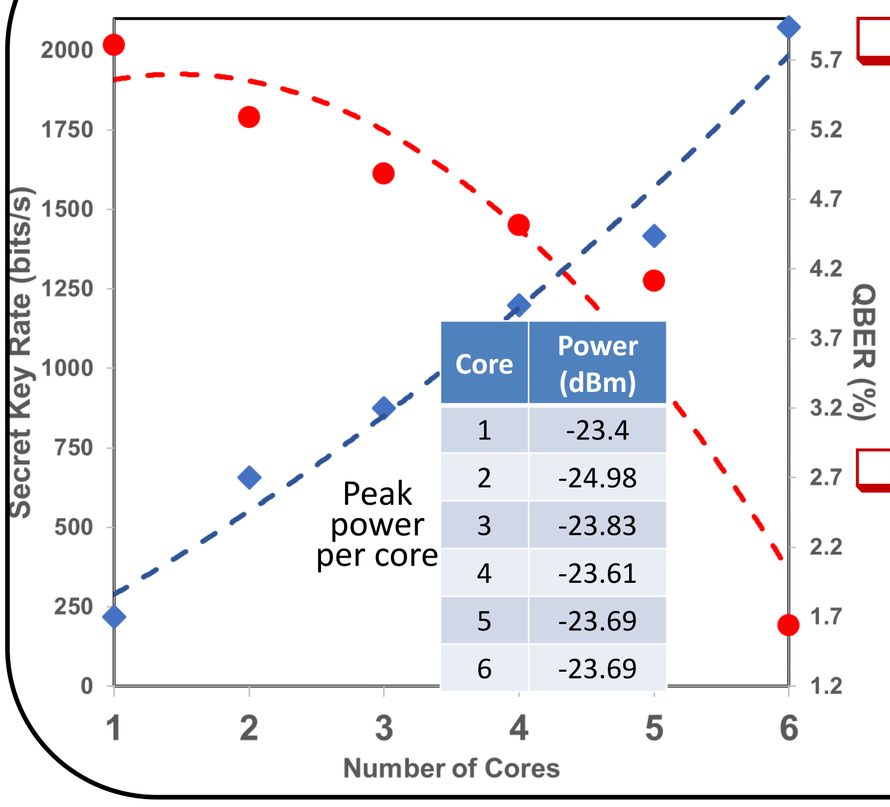


- Spectrum of the 8xCCs at the output of the Voyager/WSS
- 50GHz bandwidth/channel
- 0.8nm channel spacing (adjacent)



- Measured Crosstalk per core
- -51dBs crosstalk from other channels to core 6 (QC)

QKD System Performance



- Keys generated with crosstalk from 6 cores
- OSNR=24.6dB for BER of 5.6x10-4, (<15% FEC)

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